

REMARKS

Examiner Mitchell is thanked for the thorough examination and search of the subject Patent Application. Claim 21 has been amended and Claim 27 has been canceled.

All Claims are believed to be in condition for Allowance, and that is so requested.

Reconsideration of the rejection under 35 U.S.C. 103(a) of Claims 21-24, 26, 28, and 29 as being unpatentable over Sakurai et al in combination with Christiansen et al is requested in accordance with the following remarks.

Sakurai et al does not teach or suggest an epoxy layer covering a portion of the side surfaces of the conductor. Christiansen et al teaches that an epoxy glob can provide passivation “separately covering each chip” (col. 5, lines 2-4). This is done after “completion of wire bonding ... for the entire circuit board” (col. 4, lines 63-67). Thus, this epoxy glob does not cover a portion of the side surfaces of the conductor, but covers the entire chip. It is not agreed that this epoxy glob encapsulating entire chips has anything to do with the insulating layer of Sakurai et al. Sakurai et al form an insulating layer 14 covering pads on a chip [0097]. This layer is formed in the process of forming a bump on the pad. Thus, since the encapsulation film of Christiansen is used in a different part of the process from the pad insulating film in Sakurai et al, there would be no motivation to use the encapsulation film of Christensen in place of the insulating film of Sakurai et al.

Claim 23 claims “each of the copper conductors comprise a plurality of plated copper layers.” Sakurai et al does not teach or suggest that the metal pillar 90 (paragraphs 0160-0174) comprises a plurality of plated copper layers, as claimed in Claim 23.

Reconsideration of the rejection under 35 U.S.C. 103(a) of Claims 21-24, 26, 28, and 29 as being unpatentable over Sakurai et al in combination with Christiansen et al is requested in accordance with the remarks above.

Reconsideration of the rejection under 35 U.S.C. 103(a) of Claim 25 as being unpatentable over Sakurai et al and Christiansen et al and further in combination with Jin is requested in accordance with the following remarks.

As discussed above, the combination of Sakurai et al and Christiansen et al does not teach or suggest an epoxy layer covering a portion of the side surfaces of the conductor. While it is agreed that Jin teaches nickel and gold layers 30 and 32 under reflowable material 36 (Fig. 12), the combination of Jin with Sakurai et al and Christiansen et al would not result in Applicant’s invention since none of the references teach or suggest an epoxy layer covering a portion of the side surfaces of the conductor.

Reconsideration of the rejection under 35 U.S.C. 103(a) of Claim 25 as being unpatentable over Sakurai et al and Christiansen et al and further in combination with Jin is requested in accordance with the remarks above.

Reconsideration of the rejection under 35 U.S.C. 103(a) of Claims 21, 24, 28, and 29 as being unpatentable over Zuniga-Ortiz et al in combination with Test et al is requested in accordance with the following remarks.

The passivation film 108 of Zuniga-Ortiz et al is not the same as the epoxy layer 410 of Applicant's invention. Applicant's layer 410 is coated onto the substrate surface after formation of the copper pillars, as taught on page 10 of the Specification and as shown in the progression of drawing figures 4B-4D. The passivation film 102 and additional polymer layer 108 of Zuniga-Ortiz is formed overlying the pad. An opening is etched into the passivation layer to expose the pad. The conductor is then formed within the opening in the passivation layer 102 and layer 108. (see Fig. 1 and paragraphs 0031-0033). As shown in Fig. 1, the conductor 103 does not extend "vertically a first predetermined distance from said surface of said semiconductor die" as claimed in claim 21 nor does the layer 108 "partially cover[s] lower portions of side surfaces of substantially all of said conductors".

Test et al claims an epoxy as an encapsulation material (col. 9, lines 55-57). In Fig. 5, this encapsulant 60 is shown as filling the gaps between wire bonds 53. This material, encapsulating a completed flip-chip assembly, has nothing to do with the passivation layer of Zuniga-Ortiz or with Applicant's epoxy layer partially covering side portions of the conductors.

Therefore, the combination of Zuniga-Ortiz et al with Test et al does not teach or suggest the epoxy layer covering a portion of the side surfaces of the conductor and the reflowable

material covering another portion of the side surfaces of the conductor not covered by the epoxy layer.

Reconsideration of the rejection under 35 U.S.C. 103(a) of Claims 21, 24, 28, and 29 as being unpatentable over Zuniga-Ortiz et al in combination with Test et al is requested in accordance with the remarks above.

Allowance of all Claims is requested.

It is requested that should Examiner Mitchell not find that the Claims are now Allowable that the Examiner call the undersigned at 845-452-5863 to overcome any problems preventing allowance.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'SBA', with a long horizontal flourish extending to the right.

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